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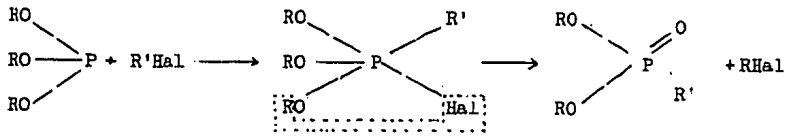
G. KH. KAMAY'S WORK ON ORGANOELEMENTAL COMPOUNDS

S. V. Rogozhin, Cand Chem Sci

In 1951, Prof G. Kh. Kamay was awarded a Stalin Prize, third class, for his work in chemistry. This work testifies to the great achievements of native science in the chemistry of organoelemental compounds. Between 1949 and 1951, Kamay completed and published a number of research papers in the journals Doklady Akademii Nauk SSSR and Zhurnal Fizicheskoy Khimii, devoted to the study of the organic compounds of arsenic and phosphorus. In recent years, the field of organophosphorus compounds has acquired great practical significance. Thus, among organophosphorus compounds, there are excellent flotation agents for ore concentration, insecticides, anticorrosive admixtures for lubricants, and many others. In his work, Kamay developed and broadened the application of methods of synthesizing phosphonic acid esters.

A. Ye. Arbuzov, the founder of the contemporary chemistry of esters of phosphorus acids, determined that, as a result of the action of alkyl halides on the esters of acids of trivalent phosphorus, the alkyl halide is added to the phosphorus atom. The unstable addition products so formed decompose to an alkyl halide and a completely substituted alkylphosphonic acid ester.



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Continuing the work of his mentor, A. Ye. Arbuzov, Kamay utilized the polyhalide derivatives of paraffins to synthesize esters of halogenoalkyl phosphonic acids.

$$CCl_4 + (RO)_3P \longrightarrow (RO)_3P\begin{matrix}CCl_3\\Cl\end{matrix} \longrightarrow (RO)_2{\cdot}P\begin{matrix}O\\CCl_3\end{matrix} + RCl$$

Kamay was the first to prepare esters of organophosphorus acids containing the trichloromethyl group. In this manner, Kamay synthesized and described about 20 previously unknown compounds, thus broadening still more the area of application of Arbuzov's reaction in the field of organophosphorus compounds. In addition, more than 20 new phosphonocarboxylic acid esters and their corresponding amides have been synthesized.

In his research on organoarsenicals, Kamay synthesized a great number of new substances with different chemical structures. For the first time a new class of arsenic-organophosphorus compounds was synthesized. These new compounds contained the arsenic-phosphorus bond and in addition to that, comprised a series of other interesting arsenic and phosphorus derivatives. The accomplishment of these syntheses, often quite difficult, required great resourcefulness and an extraordinary amount of experimental chemical skill.

The results obtained enriched the chemistry of organophosphorus and organoarsenic compounds with an impressive number of previously unknown substances. The results also facilitated the development of methods of synthesizing organophosphorus and organoarsenic compounds.

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